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SOCIAL SECURITY
FUNDS, PAYROLL
TAX ADJUSTMENT
AND REAL
EXCHANGE RATE:
THE FINNISH
MODEL

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Abstract: This paper presents the Finnish system of EMU buffer funds. The idea of the buffer funds is to finance temporary reductions of payroll taxes in a case of asymmetric shock facing the economy. It is well-known that by adjusting payroll taxes it is possible to change real exchange rate, provided that nominal wages are kept unchanged. The paper presents estimation results on the sufficient size of buffer funds. It is shown that relatively modest funds would be capable to cover the costs of stabilization if asymmetric shocks occur.

Key words: Payroll taxes, real exchange rate, Monetary Union

Tiivistelmä: Tutkimuksessa esitetään Suomen EMU-puskurirahastojen toimintaperiaate. Puskurirahastojen tarkoitus on rahoittaa väliaikaisia työnantajan sova-maksujen alentamisia tilanteessa, jossa talouteen kohdistuu epäsymmetrinen häiriö. Sova-maksuja sopeuttamalla on mahdollista saada aikaan joustoja työvoimakustannuksiin. Tällöin nimellispalkkoja ei tarvitse alentaa kilpailukyvyn parantamiseksi, kun valuuttakurssipolitiikka poistuu yhteisen rahan oloissa. Tutkimuksessa arvioidaan tarvittavien puskurirahastojen suuruutta. Tulosten mukaan jo kohtuullisellakin puskurirahastolla voidaan kattaa epäsymmetristen häiriöiden aiheuttama yrittäjien kannattavuuden heikkeneminen.

Asiasanat: Sova-maksut, reaalin valuuttakurssi, rahaliitto

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1. Introduction

The introduction of the single currency entails the surrender of independent monetary and exchange rate policy. National currencies and flexible exchange rates have – at least in principle – made it possible to rapidly stabilize unexpected external or internal economic shocks by means of exchange rate adjustments. The removal of this facility from the range of tools available to economic policy severely restricts the ability of economic policy to offset asymmetric shocks. This has been seen as a main risk of EMU membership in Finnish and Swedish discussions.

In Finland a debate has sprung up concerning counter-cyclical mechanisms that could replace exchange rate flexibility. One way to substitute the adjustments of nominal exchange rate is to induce variations in payroll taxes to adjust real exchanges rate. In short run this is possible if nominal wages are fixed. Assumption of quasi-fixed nominal wages is realistic – and it explains why nominal exchange rate and other nominal prices matter.

In Finland the social partners have agreed on establishment of a system of "buffer funds" in order to institutionalize the sustainable use of payroll taxes for stabilization purposes. So-called buffer funds are an instrument which enable payroll tax adjustments without fiscal imbalances. These are funds that help to finance payroll tax compensations for the loss of exchange rate flexibility without altering the terms of employment.

The aim of this report is to assess, using a simple labour market model, the feasibility of buffer funds, and the sufficient size of any such funds. The rest of this paper is organized as follows. First, we shall take a brief look at the susceptibility of the Finnish economy to shocks. It is shown that severe asymmetric shocks have been typical of Finland in past. Section 3 discusses the automatic stabilization mechanisms of economy. The idea of using payroll tax adjustments as a method of internal devaluation is presented in Section 4 by the help of a simple model of small open economy. We present also estimation results on sectoral labour demand elasticities which help one to approximate the size of stabilizing funds. Sections 5 and 6 discuss the practical implementation of EMU buffer funds in Finland.

2. The susceptibility of the Finnish economy to shocks

The main reason why exchange rate adjustments have been considered necessary in Finland is the susceptibility of the Finnish economy to shocks. One way to assess the economy's susceptibility to shocks is to study its past history. Previous experience gives a picture of the shocks that have typically afflicted the Finnish economy in past decades. It is likely that, having joined EMU, and with ever closer integration of the economy into the EU single market, production structure will change and trade flows will be realigned so that the new conditions are adjusted to and asymmetric shocks become less common.

Gradually, therefore, the change in the structure of production and the structure of trade will reduce the susceptibility of the economy to shocks.¹ In the short and medium term, however, the structure of production and foreign trade is pre-ordained. In the early years of EMU membership, therefore, it would be prudent to factor in the possibility that the economy could be afflicted by shocks in the same way as hitherto.

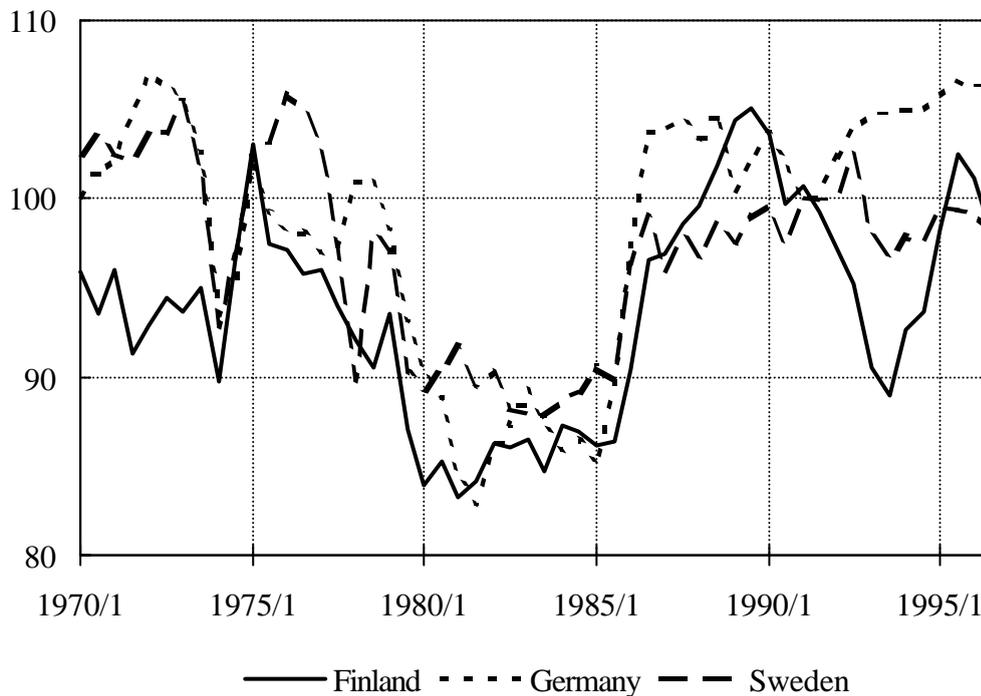
What, then, are the most important sources of shocks to the Finnish economy? In this century, it has been a sudden and unexpected change in foreign trade prices that has triggered a typical external shock and for which there was no contingency. The collapse of export markets (such as the Russian market in 1918 and the Soviet market in 1990-91) and a sharp downturn in export prices have been some of the central features of the most severe asymmetrical shocks. Changes in import prices (the big swings in world market prices for oil in 1973, 1979, 1986 and 1990 are often-cited examples of this), on the other hand, have generally affected Finland in much the same way as the rest of western Europe, and thus have not represented asymmetrical shocks. Thus the principal threat to Finland is an unfavourable change in the terms of trade caused by a drop in export prices (see Figure 1). Major changes of this type impacting the profitability of exports have affected the Finnish economy throughout its history.

A weakening in the terms of trade immediately reduces the income of the open sector of the economy and raises so-called product wages, i.e. gross wages relative to producer prices. Under such circumstances there are three means of adjustment: a reduction in employment, a reduction in labour costs or a weakening in the value of the currency. The quickest way to adapt competitiveness is a flexible exchange rate, which effectively eliminates the effect of the fluctuation in export prices on the domestic currency.²

¹ See e.g. Kajaste (1994), who estimates that the structure of Finnish exports will rapidly adapt in a positive direction.

² There has been much dispute about the effects of changes in exchange rates. However, convincing evidence has been put forward that exchange rate adjustments enacted to correct imbalances have had

Figure 1: *Development of terms of trade in Finland, Sweden and Germany*



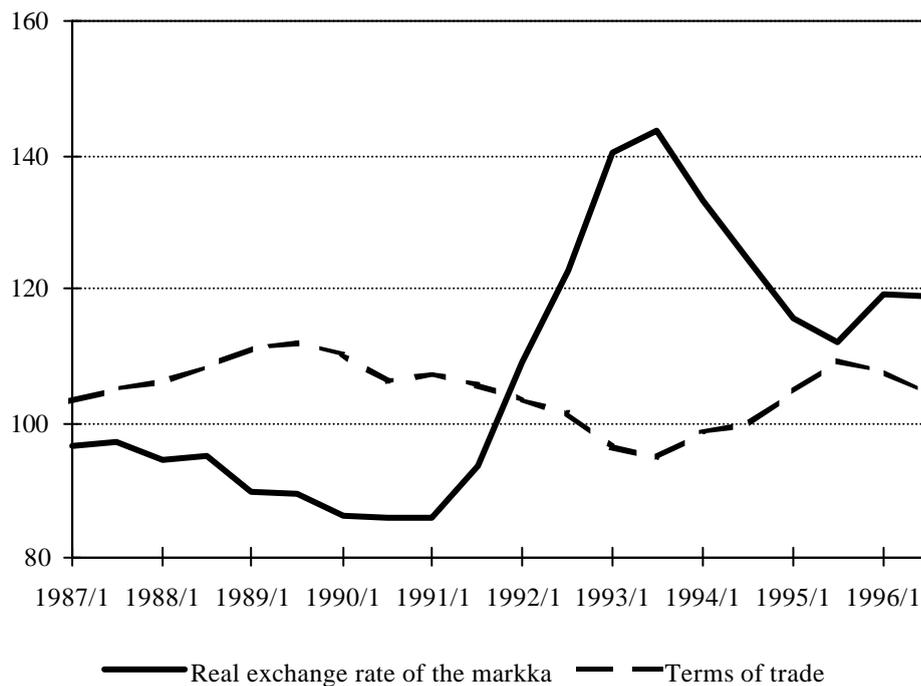
By definition, exchange rate flexibility cannot exist under monetary union. Under such circumstances, swings in export prices are reflected immediately and fully in the profitability of exports. Negative shocks necessitate adjustments in real exchange rate, as a result of which the domestic cost level falls. A marked improvement in the terms of trade, on the other hand, generally also leads over time to a real strengthening of the exchange rate; if the nominal exchange rate is fixed, this will come about via a rise in the domestic price level. This is what happened in the latter half of the 1980s, when in the aftermath of a positive export price shock domestic inflation exceeded international inflation and the Finnish economy was overheated. It is quite possible that even within EMU improved terms of trade are perceived as a permanent state of affairs, gradually leading to a corresponding increase in the domestic price level relative to other EMU countries. But since sooner or later the terms of trade will turn down again, painful adjustments will lie ahead.³ Figure 2 shows how exchange rate movements have compensated for fluctuations in the terms of trade in recent years.

relatively long-term real consequences (Obstfeld 1995). On the other hand, exchange rate adjustments do not lead to changes in other prices of the same magnitude. In Finland exchange rate adjustments have evidently lessened swings in producer prices (see Erkkilä and Widgren 1996). If all exchange rate adjustments in past would have been ineffective, there would be no concerns about abandoning exchange rate policy (cf. Calmfors 1998).

³ Under fixed exchange rates it is difficult to maintain price stability if, for example, the terms of trade fluctuate. If exchange rate movements are ruled out, a rise in the real exchange rate will lead to a general

Under the single currency, the balance of payments restriction, which earlier was an important restriction on economic policy and a source of crises, is removed. A weakening in the terms of trade will not any more lead to a rise in the interest rate level, which assists the closed sector. Exchange rate risk will also be substantially reduced compared to the present, even though it will not be removed entirely. The risk will remain vis à vis important currencies remaining outside EMU (besides the dollar and the yen, these will possibly include the British pound and the Swedish, Danish and Norwegian crowns). The more stable monetary conditions under EMU will improve the fundamentals and risk-bearing capacity of the Finnish economy, most especially in the closed sector. Nonetheless, genuine price and demand-side shocks in foreign trade are risks that will remain. Even in EMU one should be prepared for severe asymmetrical shocks buffeting the economy from time to time. These will call for rapid adjustment in the price level in order to avoid large rises in unemployment.⁴

Figure 2: *The terms of trade and the real exchange rate*



increase in the cost and price level (cf. Svensson 1994). Various studies have concluded that asymmetric shocks are especially typical of Finland (cf. Ahonen and Pyyhtiä 1996, Haaparanta and Heinonen 1991, Erkkilä and Widgren 1996, Kiander 1996a).

⁴ Similar concerns were also acknowledged in the EMU report commissioned by the government of Sweden, see Calmfors et al (1997).

If, as a result of forecasting errors or irreconcilable conflicts of interest, the macroeconomic co-ordination of the domestic economic decision-making process is dysfunctional, it is wholly possible, even within EMU, that the domestic cost level could rise to a level that would be too high for export to be competitive. Such a development would lead to a decline in the share of the open sector and increased indebtedness of economic agents. Under favourable conditions, given good Finnish creditworthiness and a low European interest rate level, such a trend could remain in place for some considerable time. However, indebtedness makes the economy vulnerable, and if export suddenly run into difficulties, there could be serious consequences which requires a rapid adjustment in the cost level of the entire economy.

In terms of susceptibility to shocks, the crucial issue is whether EMU and integration into the single market will lead to a diversification or narrowing of production structure. Finland's long geographical distance from the main Western European markets would tend to indicate the latter outcome. On the other hand, integration has generally led to an increase in cross-trade.⁵

⁵ See e.g. Alho, Kotilainen and Widgren (1992), Alho and Widgren (1994), Erkkilä and Widgren (1996) and Kaitila (1996).

3. Automatic adjustment of the economy

In the event of an external shock (i.e. an unexpected and unfavourable relative change in prices), the economy immediately begins to adjust, via its own mechanisms, towards a new balance. The engines of this adjustment are firms, public finances and the labour markets.

3.1 Profitability

The first area to react to changes in producer prices is company profitability. The better companies' financial situation, the better they can withstand negative price shocks. If, for example, the costs of labour force adjustment are high, firms will not adapt their labour forces, at least not straight away, even if their profitability weakens. Clearly, however, companies will aim to operate in an optimal manner so as to maximise profits, so that they will not maintain employment for very long if it is not profitable. Thus a fall in producer prices – unless merely a temporary and short-term phenomenon – will also gradually lead to a downturn in employment because lower producer prices or productivity means that real labour costs are higher. This change will come about more slowly if the reduction of the labour force entails costs.

Rational owners or managers will adapt their firms' operations to the EMU environment in advance, and there are clear signs of this. In the 1990s the financing structures and investment policy of Finnish firms have changed considerably. With a stronger financial structure and less burdensome investments, firms will be able to adapt better. Thus the serious profitability crisis of large firms characteristic of previous Finnish devaluations is not likely to pose such a threat in future. It will be no longer necessary to make such competitive adjustments in order to save large firms from bankruptcy. On the other hand, firms may react to weak local competitiveness by transferring production elsewhere.

3.2 Automatic stabilizers

In Finnish policy discussions, many commentators have considered public finances to be a central counter-cyclical instrument within EMU. In principle, it is true that the solid financial position of public finances means that it is possible to conduct counter-cyclical fiscal policy, even in the presence of the EMU stability pact. However, the ordinary functioning of public finances through automatic stabilisers is re-active and only deals with the consequences of weakened competitiveness, i.e. the costs resulting from unemployment. Traditional fiscal policy cannot restore competitiveness or prevent deteriorating employment in the open sector. On the contrary, the reverse is more likely, if unemployment benefits and income support,

financed with budget deficits, serve to maintain high wage claims and slow down the necessary adjustment in the price level of the economy.

The EMU stability pact presents further problems since it imposes restrictions on budget deficits. The agreed one and three per cent ceilings on new debt are very low and at worst they could prevent the operating of the automatic stabilizers. This may happen if, for example, the unemployment rate were to increase by three to five percentage points within a short time. The fiscal consequences of such a shock would most likely be in conflict with the stability pact. Thus, from the point of view of the functioning of public finances and the stability of the economy it will be of paramount importance to prevent steep increases in unemployment in future.⁶ If unemployment remains in check, public finances will remain balanced. However, on the other hand, faced with an increase in unemployment, contractive measures have to be taken to combat a spiralling deficit, the result could be a downward spiral and a very severe recession.

3.3 Employment and labour costs

The labour markets may react to a fall in producer prices in many ways. If there is no flexibility in costs, the adjustment will take place in the form of the labour input. Either employment or working hours will contract. Any contraction in employment generally takes place entirely on companies' conditions. On the other hand, a reduction in working hours without any compensation requires the agreement of the parties concerned.

The need for adjustment in the labour input may be reduced if labour costs can be brought down in line with the reduction in producer prices. In a low-inflation environment, a reduction in the relative cost level can be brought about by reducing either (a) nominal wages, (b) profitability-related bonus pay or (c) employers' social security contributions. The different forms of adjustment have different effects on the economy.

In terms of the stability of the economy, the most problematic is a reduction in nominal wages.⁷ Changes in nominal wages are likely to be transferred to private consumption because a reduction in nominal incomes initially reduces households' purchasing power. The likely outcome of that is a reduction in domestic demand, curbing employment particularly in the closed sector. A reduction of nominal incomes may also be destructive since of all debts are usually fixed in nominal

⁶ The possibility of hysteresis makes the preventive measures even more important.

⁷ Blanchard and Summers (1987) and Tobin (1993), among others, have pointed out the problems caused by flexibility. The Finnish debate on integration initially favoured the idea that flexibility in wages would be an unproblematic way to compensate for exchange rate flexibility (Hetemäki, 1994 and 1996; Alho et al., 1992; Alho and Widgren, 1994; Oksanen, 1994; and Ojala, 1996).

terms. Hence a wage cut would increase real indebtedness. For these reasons a general reduction in wages is a particularly problematic measure of adjustment.

Also profit-sharing is pro-cyclical and hence potentially destabilizing (unless the profit-related bonuses are invested in wage-earner funds and paid out only after a long period). The third possible way to stabilize real labour cost is to let the employer's social security contributions to vary cyclically. If the producer prices decrease, the real product wage can be stabilized by reducing (temporarily) the payroll taxes. Hence adjustable payroll taxes would enable adjustments in real exchange rate which would be identical with nominal exchange rate changes, provided that nominal wages are fixed.⁸

In order to make such a system of internal devaluations' financially sustainable, the social security system needs a stabilizing fund, which we call "EMU buffer fund". In short, the idea is to collect a surplus in good times to be used in bad times.

⁸ This idea is discussed also in Calmfors (1998).

4. Where do buffer funds come in?

4.1 Can funds help?

As stated above, even within EMU the Finnish economy may be subject to a number of shocks. These shocks can be classified according to various different criteria. The duration of the shock is of crucial importance. Faced with long-run, i.e. structural, shocks, any temporary changes in real exchange rate and stabilizing funds can play only a marginal role. In such circumstances funds can do little more than cushion the inevitable adjustment. When it comes to regulating the effects of short-run shocks, payroll tax flexibility does have a role if it can be applied to the shock in question in the right way. If the shock is overridingly seasonal in nature, and if businesses believe that it is only temporary, there is no need for any special action to be taken, and companies' profitability will take the strain. In the following the assumption is that the economy is faced with a shock which is sufficiently serious for firms to cut labour demand assuming there's no changes in labour costs.

A further crucial issue is whether all EMU countries are affected by similar shocks or whether the shocks afflicting one member country differs from those in other EMU countries. Shocks affecting all EMU member states are best handled by joint and co-ordinated measures. The European Central Bank can react to shocks affecting the whole of the EU, and in such cases separate national actions will not be necessary.⁹

A third important consideration is what are the sectors of the economy that might be afflicted by any shock. The government's margin for issuing new debt could be considered as an implicit fund to be used to absorb the effects of different shocks. Although there are mechanisms in the state budget that can act as automatic stabilizers, it may be slow to exert influence only through them. In many cases action via the state budget can only treat the consequences of shocks. A properly implemented buffer fund, on the other hand, may be capable of preventing the effects of shocks in the real economy.

The mechanism of the state budget and the prevention of shocks by means of buffer funds can be illustrated with the following example. Let us assume that stabilization

⁹ Under article 103a of the Maastricht Treaty the European Council, acting on the recommendation of the Commission, may grant economic aid to individual member states in the case of a particularly severe shock. For this article to be applied, however, the shock would have to be very serious indeed. It is not intended to level out cyclical fluctuations in the economy. In this connection it should be noted that the euro floats against non-EU currencies and that the share of non-EU trade of total EU production is very small. Thus the European Central Bank is free to conduct a very independent monetary policy based on the particular needs of the EMU zone, just as the US Federal Reserve does.

terms of trade¹⁰ deteriorate rapidly, say as the result of a decline in export prices. As export prices deteriorate, so do domestic producer prices, too.

Given a fixed exchange rate and fixed nominal wages, the real product wage will then rise in the open sector, unless there is a compensating reduction in employers' social security contributions. An increase in the real product wage, in turn, will lead to a deterioration in employment and an increase in unemployment. As unemployment rises, the state budget deficit will start to grow as expenditure on unemployment benefits increases and tax revenue decreases. Thus the state budget does not prevent transmission of the shock to the economy, but (merely) cushions the repercussions of the shock on incomes distribution.

Can the economic effects of a shock be prevented by means of a stabilizing social security fund? Since the exchange rate and nominal wages are fixed, the effect of a decline in export prices on the real product wage can be eliminated by reducing employers' social security contributions. By reducing social security contributions the effect of lower export prices in terms of an increased product wage is thus eliminated. Since on average the real product wage remains unchanged, the external shock does not have a major effect on either employment or unemployment. The shock will affect the state budget only if the state participates in financing the shortfall in the "tax take" as a result of the decrease in social security contributions. However, this is not necessary. If insurance contributions are financed in an optimal fashion, the liability shortfall caused by the negative external shock can be made good later when there is a positive external shock. Assuming it's proper functioning, such a funding system would prevent or at least cushion the effects of external shocks on the state budget by preventing major swings in employment. Therefore, a successful funding would reduce swings in the state budget balance.

4.2 The need for fund transfers in neutralising the employment effects of external shocks

The requirement to build up surpluses of social security contributions and the manner how the behaviour of trade unions and firms affects that funding-process will be examined using a simplified labour market model as follows. The basic assumption of the model is that the real product wage is determined by the productivity trend of the economy in tandem with the low inflation required by monetary union. In the long run, moderate wage formation will support stable employment and low price rises.

¹⁰ As a result of the Finnish production structure, export prices have fluctuated much more than import prices. It is likely that this will continue to be the case despite the diversification that has taken place in the structure of exports in the 1990s.

As before, it is assumed that the Finnish economy will continue to be beset by external shocks, even within EMU. These external shocks are assumed to result from swings in Finland's average export prices, which diverge from the trend in Europe as a whole, meaning that Finland is afflicted by asymmetric shocks. Flexibility in labour costs, achieved through the funding of social security payments, is used to eliminate the effects of fluctuations in export prices on the real product wage.

The relative change in the real product wage, i.e. the total labour cost deflated by producer prices, is positively dependent on the relative change in the nominal wage and the relative change in the employers' social security contribution variable, and is negatively dependent on the relative change in the producer price. Let us define the average producer price (q), the export price (e) and the domestic producer price (q_{FIN}) as a weighted average:

$$q = \alpha + (1 - \alpha)q_{FIN}.$$

In this case an increase in social security contributions and a decrease in producer prices will raise the real product wage. The basic premise of the stability that funding is designed to achieve is that the real product wage should remain independent of short-run shocks in the economy. In that case, shocks will not affect employment. In the model, therefore, employment (L) is dependent on the real product wage, i.e.

$$L = L \left[\frac{w(1+s)}{q} \right], \quad L' < 0,$$

where w is the nominal wage and s is the employer's social security contribution.

The model contains two behavioural equations. The first depicts trade union behaviour in wage-setting and the other firms' pricing policy. Besides their purchasing power objective, trade unions are also assumed to care employment, which is dependent on companies' wage-paying ability. Nominal wage demands are thus negatively dependent on social security contributions and positively dependent both on the producer prices paid to companies and the consumer prices paid by consumers (p). A rise in social security contributions will increase employers' labour costs and hence reduce their wage-paying ability. A rise in producer prices, on the other hand, will increase wage-paying ability. A rise in consumer prices will decrease the purchasing power of nominal wages and will be reflected in pressures for higher nominal wages:

$$w = w(q, p, s); \quad w_q, w_p > 0, w_s < 0.$$

Producer prices are assumed to be dependent on domestic market prices and on export prices as determined on world markets.¹¹ Both a rise in domestic costs ($w(1+s)$), which will affect domestic market prices, and a rise in export prices (e) will raise producer prices:

$$q = q(w, s, e); q_w, q_s, q_e > 0.$$

The determination of the consumer price closes this simple model, describing to which extent the producer prices impact consumer prices.

These behavioural models describe the historical situation. When calculating the future need for elasticity in social security payments, it is assumed, in the first instance, that any temporary change in social security payments required by the funds will affect wages and prices (the so-called traditional behavioural model). In the second alternative it is assumed that a temporary change in social security payments will not affect wages or prices (applying the so-called new rules of the game).

The analytical framework with which the need for flexibility in social security payments can be assessed in the traditional model is thus as follows.

1: External shock: random ± 10 per cent swing in export prices around the long-run trend, i.e.

$$D_e = \pm 10 \% .$$

2: Objective: external shock should not affect employment; in our model this requires that external shock should not affect the real product wage:

$$DRPW = Dw + D(1+s) - Dq,$$

where Δw is the percentage change in the nominal wage, $\Delta(1+s)$ is the percentage change in the social security payment variable and Δq is the percentage change in the producer price.

3a: Trade union behaviour (traditional behavioural model): social security payments and prices affect nominal wages:

$$Dw = tD(1+s) + tDq + nDp,$$

¹¹ Average producer prices are thus assumed to be dependent on domestic market prices and export prices, and these may diverge, at least in the short run, as a result of market segmentation.

where Δp is the percentage change in the consumer price and τ and μ are elasticities estimated from historical data.

3b: Trade union behaviour during a shock (new behavioural model): nominal wages do not react to a temporary change in social security payments (i.e. $\tau = 0$):

$$Dw = 0.$$

4a: Firms' price setting in the traditional behavioural model: changes in production costs are transmitted immediately to prices:

$$Dp = \eta Dw + \eta(1 + s) + \gamma Dc,$$

where η and γ are positive elasticities estimated from historical material.

4b: Firms' price setting in a shock under the new behavioural model: temporary changes in social security contributions do not affect prices¹²:

$$Dp = \gamma Dc.$$

5: Consumer price identity: changes in producer prices are transmitted to consumer prices:

$$Dp = \beta Dp_f,$$

where β is a positive parameter.

Using the analytical framework we can estimate the flexibility required in social security payments caused by an external shock of a certain magnitude. In order to perform the calculation we only require information on the values of the elasticity estimates in the model.¹³

Before we begin to consider the results of the calculation, we ought to discuss briefly the behaviour of the labour market partners in a shock situation. Based on

¹² Because wages are assumed to be constant (section 3b), the producer price is dependent only on changes in export prices.

¹³ The elasticity estimates were obtained from the following sources: Holm, Honkapohja and Koskela (1995) and Holm and Tossavainen (1996).

estimates from historical data, changes in social security contributions have been reflected, with a certain delay, both in nominal wages and producer prices. In this regard, for the funding of unemployment insurance contributions to be as successful as possible in the EMU environment, the behaviour of trade unions and firms need to be changed. In the new situation, cyclically induced changes in social security contributions ought not to affect nominal wages and producer prices in a negative shock. In that case, neither a decrease in social security contributions would create pressures for rises in nominal wages, nor a rise in social security contributions would create pressures for price rises in the event of a positive shock.

The former condition can be fulfilled if the labour market partners include the inflation precept into their decision-making. If buffer funds had a binding budget constraint, a cut in social security contributions in the current period would have to be compensated later with an increase in social security contributions. In such a case there would be free lunches. It is essential that the trade unions should assess the future correctly when estimating the scope for wage rises. The latter condition, i.e. price moderation, is less certain since prices are dictated on the commodity markets. If firms have market power, they can always pass (on) part of their costs to purchasers.

The parameter estimates used in the calculations, the magnitude of the assumed shocks and the results of the calculations, are given in Table 1. Let us first consider the qualitative results of the sample calculations. In a negative shock, a drop in export prices reduces producer prices, whereupon the real product wage will rise if there is no downward flexibility in social security contributions (or nominal wages). In a positive shock, correspondingly a rise in export prices will raise producer prices, whereupon the real product wage will fall if there is no upward elasticity in social security contributions (nominal wages).

Table 1: The need for flexibility in social security contributions in the event of an external shock in the simplified labour market model

1: Elasticities

- elasticity of nominal wage with respect to social security variable: $\tau = -.3$
- elasticity of nominal wage with respect to consumer price: $\mu = .5$
- elasticity of producer price with respect to labour costs: $\eta = .7$
- elasticity of producer price with respect to export price: $\gamma = .3$
- elasticity of consumer price with respect to producer price: $\beta = .8$

- 2: Positive shock: export price rises 10%
Negative shock: export price falls 10%

3: Change in social security contributions: percentage points

	Old model	New model
Positive shock	5.4	3.3
Negative shock	-5.4	-3.3

Why is the need for elasticity in social security contributions greater in the old model than in the new model? In the old model a drop in social security contributions is reflected in pressures for increases in nominal wages. In that case social security contributions would have to fall more than if wages remained unchanged so as to eliminate the increased real product wage induced by higher nominal wages. Correspondingly, in the old model, an increase in social security contributions is reflected in pressures for increases in producer prices which reduces the real product wage. A rise in producer prices, in turn, increases consumer prices and creates pressures for increases in nominal wages. Thus in order to eliminate these effects social security contributions would have to rise further.

If external shocks occurred in the form of changes in export prices they could be fully neutralised by means of funding unemployment insurance contributions in the way presented, an external shock would have no employment effects. The effects on real wages and on inflation as measured by producer prices and consumer prices would also be very small. In fact the regime of the new model is defined in such a way that an external shock has no effect at all on the domestic price level.

In the following the above model is applied to different sectors in the economy assuming that there exists no wage-wage links between the different sectors. The elasticities in the social security contributions of different industries are calculated on the assumption that the same shock takes place in all industries of the

open sector at the same time and that they are based on industry-specific estimates of wage elasticity of labour demand (table 2).

*Table 2: Need for flexibility in social security contributions (%-points).
The open sector industries facing a negative shock at the same
time (10 per cent fall in prices)*

	Old model	New model: fixed wages
Food industry	-9.6	-1.1
Textile and clothing industry	-9.6	-1.1
Timber industry (wood)	-12.4	-3.0
Pulp and paper industry	-12.4	-3.0
Graphic industry	-0.2	-1.5
Chemicals industry	-11.4	-5.8
Fuel industry	-11.4	-5.8
Basic metal and mining	-10.1	-2.2
Machinery and electronics industry	-9.8	-2.2
Transport equipment production	-9.8	-2.2
Electricity, gas and water supply	0.7	0
Building	2.6	0
Other construction	2.6	0
Trade	0.7	0
Hotel and restaurant services	0.7	0
Transport and communications	0.7	0
Finance and insurance	0.5	0
Estate and business services	0.5	0
Social and personal services	3.3	0

(The elasticities used in the calculations are given in the annex).

In principle, the required flexibility in labour costs can be achieved by means of employers' unemployment insurance contributions, differentiated by sector. In the new regime the situation is clear-cut. In each sector, only sector-specific shocks are corrected for. Because there are no external shocks in the closed sector of the economy, there is no requirement for flexibility in social security contributions either. The situation becomes more complicated if the behaviour of old model continues. In that case a change in social security contributions in one sector is reflected in producer prices of the same sector, and hence also in consumer prices. A change in consumer prices is reflected in wage formation across all sectors, which, in turn, is reflected in prices and thus spreads eventually throughout the economy. The qualitative result of the calculation is undoubtedly that a funding

system, at least on a sectoral basis, cannot work if the labour markets continue to operate by the manner of the old model.

Two aspects are deserving a particular attention. Firstly, although the labour market effects of external shocks and the way in which they can be eliminated have been evaluated here by means of a simplified “macro model”, it is our view that the magnitudes of the results of the calculations can be considered plausible. Using a small model allows one to concentrate on the issues central to the economic phenomenon whilst keeping the operative logic of the model transparent. In our view there would be no value perform similar calculations with large-scale models such as the KESSU model of the Ministry of Finance or the Bank of Finland’s BOF-5 model because the operative mechanisms of these models cannot be simplified in the same way.

Secondly, under the new “rules of the game” the employment effects of changes in social security contributions and changes in nominal wages are identical: the employment effects caused by changes in the terms of trade can be eliminated by means of flexibility both in social security contributions and nominal wages. The model assumes, however, that neither of these types of flexibility has any effect on private consumption. Nonetheless private consumption may well affect employment, especially in the closed sector. In reality significant changes in nominal wages generally do impact private consumption. In the long term, once households are able to internalise the effects of nominal wage flexibility by adapting their consumption to their long-run income possibilities, the effects of consumption on nominal wage flexibility become less significant.

Finally, the model can easily be extended to both open and closed sectors. In the model, external shocks only affect the open sector of the economy.

It is conceivable that external shocks will spread to the closed sector of the economy via changes in consumer prices and possible wage-wage links. Holm, Honkapohja and Koskela (1995) and Hartman (1997) have found empirical evidence that wages in the industries of the closed sector are dependent not only on the economic situation of the particular segment but also on wage development in the industries of the open sector.

4.3 The sufficient size of buffer funds in the light of the above examples

The previous section examined the required flexibility in social security contributions as the result of an external shock of a certain size. In order to assess the size of any funds, we need to have some idea of the duration of external shocks within EMU. Based on historical data it can be stated reliably that the duration of a shock caused by a temporary change in export prices is between one and three

years. Perhaps on average every ten years the economy will face a period of around one year that is exceptionally favourable for export prices and a period of around one year that is unfavourable for export prices.

In addition to the magnitude and the duration of any shock we also need an estimate of the tax base for social security contributions. This is easily done because the total wage bill represents the tax base. Because the funds are designed to keep employment constant in a shock situation, and since nominal wages do not vary to a significant extent, the total wage sum can be assumed to be fixed throughout a shock. If the tax base is fixed, the only factor affecting cashflows is the percentage rate at which social security contributions are set.

If all wage earners participate in the funding system, the tax base for social security contributions equates to the total wage bill in the overall Finnish economy, i.e. approximately FIM 280 billion. If it is assumed that the system only extends to workers in the private sector, the relevant wage bill is around FIM 210 billion. If it is assumed that the system only comprises the industries of the economy in the open sector, the wage bill shrinks to around FIM 125 billion. Because the estimates of the effects of export prices on producer prices are based on analysis of data relating to the private sector and/or the open sector of the economy, our analysis is restricted to assessing the size of funds applying to these sectors only. In other words, the public sector remains outside the scope of the funding. With these assumptions, the estimated size of the buffer funds is given in table 3.

Table 3: Estimated size of buffer funds (FIM)

1: Positive shock: export price rises 10%
 Negative shock: export price falls 10%

2: External shock lasts one year

	Old model	New model
Private sector	11.5 bn	7.0 bn
Open sector	6.8 bn	4.1 bn

In the old behavioural model the funds ought to be over a third larger in size compared to the new regime, in which it is assumed that trade unions exercise wage restraint and that companies refrain from changing the prices of their final products.

The calculation shows, that if funding is restricted to the open sector of the economy and if economic agents adopt the new behavioural model, an adequate fund size would be around three to five percent of the wage total. A fund of this size

could be accumulated by funding 0.3 – 0.4 percent of the total wage bill each year over a ten-year period.

The following arguments endorse adoption of the new behavioural model. When the funds are run down, future contributions have to rise, reducing the scope for future wage increases. Given this insight, any temporary easing in contribution levels would not be so easily transmitted into higher wages. Correspondingly, firms in the open sector operate in a competitive environment, which restricts their ability to transfer their costs to producer prices.

Finally, it is assumed that in the monetary union future shocks in Finland that are transmitted via import prices will be more symmetrical, i.e. similar to other EMU countries, as compared to shocks transmitted via export prices, which typically have been asymmetrical so far.

5. Aspects of the practical implementation of funding

5.1 Changes in social security contributions and its funding

As a result of unfavourable changes in world market prices the producer price received by Finnish firms may decrease. In a low-inflation environment nominal labour costs may even have to fall in order to restore the balance that prevailed before. If there is no such flexibility in wages or social security contributions, the result will be a deterioration in employment. If flexibility in social security contributions is not to endanger the financing basis of the social security system, temporary deficits have to be based on a fund system.

The fund's contributions come from the total wage sum. In order to avoid deterioration in employment the fund contribution c needs to be subtracted from the margin available for wage increases. Then the wage room, which is determined by the producer price and productivity (a), is divided into the nominal wage increase, the change in the social security contribution and the contribution to the buffer fund:

$$D_j + D_t = D_w + D(1 + s) + c.$$

The equation for calculating the fund contribution can be expressed as follows:

$$c = j[(D_j + D_t) - p], 0 < j < 1,$$

where

$$p \equiv D_{p_{EMU}} + D_t$$

is the product of the ECB's inflation target and the average labour productivity. In other words, p is the growth rate in nominal wages compatible with long-run stable employment in the EMU environment. The parameter j denotes how great part of the variation is compensated by the funds. Thus the wage increase margin can be expressed as follows:

$$D_w = D_j + D_t - D(1 + s) - j[(D_j + D_t) - p].$$

In other words, the part exceeding the long-run growth trend in the change in the wage-payment margin is partly transferred to the social security fund. Correspondingly, if the wage room undershoots the long-run trend, the fund is run down. In the following a simple rule is outlined which would comply with the counter-cyclical social security contribution principle, and which would also have a credible and robust budget constraint.

5.2 Buffer fund budget constraint

In the absence of amendments in social security funding, social insurance contributions will decrease when employment improves and increase when employment deteriorates in a system of binding budget constraint. In other words, social insurance contributions tend to exacerbate economic cycles. A buffer fund can be employed to reverse this characteristic. As stated above, the change in employment depends on changes in the real gross product wage in the following manner:

$$Dl = s(Dq + Di - Dw - D(1 + s)).$$

If nominal wages are not altered, the condition of stable employment is

$$D(1 + s) = Dq + Di.$$

In the short term, the change in labour productivity can be put at zero. A change in the producer price can also be substituted for by a change in the terms of trade, because the open sector of the economy, which dependent particularly on export prices, is susceptible to shocks (i.e. $Dq = gDe$). One could imagine that a sufficiently large change in the terms of trade would trigger a change in the social security contribution; as the terms of trade change the buffer fund is either built up or run down. Thus we obtain the following calculation rule for the social security contribution:

$$D = \lambda D \quad \forall |D| \geq w_0;$$

$$D = 0 \quad \forall |D| < w_0.$$

In other words, a sufficiently large relative improvement in the terms of trade would lead to an increase in the social security contribution, and, correspondingly, a sufficiently large relative deterioration would lead to a decrease in the social security contribution. The ability of the system to absorb shocks in export industry depends on the magnitude of the parameter λ . If it approaches the value 1, the system offers almost complete insurance for export industry. In that case it would imitate the behaviour of a floating exchange rate.¹⁴

It is essential to impose on buffer funds a budget restriction that is as binding as possible. This is important from the point of view of the credibility of the system

¹⁴ Sector-specific shocks cannot be compensated in this way unless fund contributions are also made sector-specific. Applying a so-called experience rating to unemployment insurance would entail a shift in this direction. On the other hand, it should be borne in mind that a flexible exchange rate only reacts to mean changes in the economy, and not to sector-specific shocks. If buffer funds are intended simply to compensate for the removal of exchange rate flexibility, there is no need for separate sector-specific actions.

and the EMU stability pact. It is also self-evident that no system enjoys limitless funds. It would be consistent with the spirit of the stability pact to disallow buffer funds from having net debt; in other words the absolute lower bound of the fund would be nil. On the other hand, it is not desirable that the fund should grow endlessly if, for example, in a situation where the terms of trade begin to show a trend improvement. In that case the fund could also have an upper bound, and after reaching this bound, contributions would no longer be levied.

Let us impose upper and lower bounds on the fund: $f_t \in [0, F_t]$. Then the following conditions must be satisfied for a change in the fund:

$$Df_t = \max\{D_t w_t N_t, 0 - f_{t-1}\} \text{ when } D_e < 0$$

and

$$Df_t = \min\{D_t w_t N_t, F_t - f_{t-1}\} \text{ when } D_e > 0.$$

In other words, when export prices fall sufficiently, the fund is run down and social security contributions are lowered. The extent to which social security contributions are lowered will depend on the magnitude of the change in export prices. However, contributions cannot be lowered beyond what is permitted by the fund's budget constraint. If, on the other hand, export prices rise sufficiently, the fund is cumulated up by raising social security contributions in line with the change in export prices. This is not done, however, if there is already sufficient money in the fund, i.e. if the fund is "full".

Applying a rule of this type means that the future funding need must always be taken into account in wage-setting. Running down funds after a negative shock in period t means that in subsequent periods social security contributions will have to be raised in order that the fund can be brought back up to its target level. Facing this situation, both sides in the labour market will be aware that the temporary relief brought about by the running-down of the fund will lead to a corresponding tightening of the wage payment margin in future. Thus a temporary reduction in social security contributions ought not to lead to wage pressures.

6. Practical aspects of the formation of funds

At the moment, existing social security funds in Finland include employment pension funds, unemployment insurance funds and a training and redundancy fund. In addition, some companies have their own personnel funds, which in principle could be used like buffer funds to create a margin of flexibility. The employment pension funds are by far the largest of the current funds. By their long-term nature, however, they are poorly suited as buffer funds for cyclical stabilization purposes. In contrast, the unemployment benefit funds are better suited as buffer funds since they could allow flexibility in unemployment insurance contributions (see Holm and Mäkinen, 1998). The training and redundancy fund would also be apposite since it could be developed more along the lines of a buffer fund. In addition to the current funds, new funds have also been proposed (Luimula, 1997). One such example could be a training fund, which could disburse money for personnel training as an alternative to termination of employment. Another proposal has been to extend the current personnel funds into a comprehensive system offering substantial elasticity.

In our opinion, the simplest method is to develop the current unemployment insurance into an explicit funding system. This would require current unemployment insurance contributions to be set at a level which they would cover, in addition to the running costs of unemployment insurance, an annual accumulation of around 0.3 – 0.5 percent of the total wage bill. In an environment of declining unemployment this does not necessarily represent a major problem as all it would mean is that contributions would decline more slowly. If this change is taken into consideration in wage agreements, it would not have any employment effects. Once the funding target has been reached, contributions can be lowered. In the long term, the fund's investment income will also serve to lower contributions to the fund.

The central labour market organisations mutually concluded on 17 November 1997 a buffer agreement aiming at absorbing economic disturbances in conditions of monetary union. In the unemployment insurance system, the buffer agreement is intended to moderate the fluctuations of the unemployment insurance contributions of employers and wage earners by means of the Unemployment Insurance Fund (former Central Fund). The aim is that by the years 2002 - 2004, a fund amounting to about FIM three billion be collected from employers and wage earners in unemployment insurance contributions. According to the agreement, the fund may also get into debt in a recession.

In the evolution of the economy and of employment remain favourable till the year 2004, surplus will be accumulated in the Unemployment Insurance Fund, and this surplus can be used to balance the fluctuations of unemployment insurance contributions in possible future recessions. The size of the Unemployment

Insurance Fund depends most on the improvement of employment and the magnitude of the unemployment insurance contributions levied on the total wage bill during the years 1998 - 2004. The sought Unemployment Insurance Fund of about FIM 3 billion in 2004 can be attained, even if unemployment insurance contributions were to go down gradually from the current 4.2 per cent to 2.8 per cent (see Holm and Mäkinen, 1998).

Additionally, companies could develop in-house buffer systems through their personnel funds.¹⁵ In principle, this could make it possible to move over to a system of bonus remuneration. However, this would call for a long planning horizon and commitment from firms and employees alike.

Clearly, the assets of buffer funds would have to be invested as safely as possible. A large fund provides plenty of scope for diversifying risks. The question of how the fund and changes in it affect the EMU criteria will have to be clarified with the EU.

It should be borne in mind that funds can only alleviate temporary shocks in the economy. For example, they are powerless to prevent the need for a decline in real earnings in the face of a lasting deterioration in the terms of trade. On the other hand, the use of funds does provide some breathing space even in the case of lasting shocks. In this respect funds operate in the same manner as devaluation except that use of the funds does not create inflationary pressures and helps to maintain economic stability.

¹⁵ Industry-specific flexibility could also be achieved by ranking employers' unemployment insurance contributions by segment, thereby introducing the experience rating principle. For more on this subject, see Kiander (1996b).

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Table: *Long-run elasticities*

	EMPLOYMENT EQUATION		NOMINAL WAGE EQUATION			PRODUCER PRICE EQUATION	
	Price elasticity	Activity elasticity	Producer price elasticity	Consumer price elasticity	Payroll tax elasticity	Gross wage elasticity	Exchange rate elasticity
Food industry	-1.173	1.173	0.485	0.353	-0.485	0.896	0.093
Textile and clothing industry	-1.173	1.173	0.485	0.353	-0.485	0.896	0.093
Timber industry	-0.544	0.686	0.164	0.400	-0.164	0.763	0.240
Pulp and paper industry	-0.544	0.686	0.164	0.400	-0.164	0.763	0.240
Graphic industry	-0.857	0.716	0.555	0.384	-0.555	0.420	0.123
Chemicals industry	-0.164	0.268	0.150	0.479	-0.150	0.513	0.457
Fuel industry	-0.164	0.268	0.150	0.479	-0.150	0.513	0.457
Basic metal and mining	-0.667	0.133	0.100	0.514	-0.100	0.793	0.170
Machinery and electronics	-1.415	0.972	0.202	0.462	-0.202	0.793	0.170
Transport equipment production	-1.415	0.972	0.202	0.462	-0.202	0.793	0.170
Electricity, gas and water supply	-0.474	0.469	0.182	0.569	-0.182	0.776	-
Building	-1.601	1.073	0.639	0.288	-0.639	0.866	-
Other construction	-1.601	1.073	0.639	0.288	-0.639	0.866	-
Trade	-0.474	0.469	0.569	0.569	-0.182	0.776	-
Hotel and restaurant services	-0.474	0.469	0.569	0.569	-0.182	0.776	-
Transport and communications	-0.474	0.469	0.569	0.569	-0.182	0.776	-
Finance and insurance	-0.925	0.800	0.472	0.472	-0.180	0.642	-
Estate and business services	-0.925	0.800	0.472	0.472	-0.180	0.642	-
Social and personal services	-0.887	0.754	0.161	0.161	-0.800	0.717	-